

CLAIMS

What is claimed is:

1. A system that facilitates conveying notifications, comprising:
 - a component to determine a time period to deliver information based upon an urgency of the information; and
 - a notification component to convey the information based at least in part upon endpoint sensing of at least one device and the time period.
2. The system of claim 1, the time period is a bounded deferral period that relate to a deadline for making a user aware of a message containing information of value to the user, wherein a tolerance or deferral is dependent on the urgency of the information.
3. The system of claim 1, the endpoint sensing relates to a transmission reliability associated with a probability that a message is conveyed to a user given endpoint sensing of the device and/or estimates given background information.
4. The system of claim 2, the bounded deferral is associated with at least one of sensors, calendar information, an alerting type and a time of day to determine whether a user is too busy to receive an alert currently or in a predetermined time in the future.
5. The system of claim 4, further comprising policies for processing a deadline associated with conveying notifications.
6. The system of claim 5, the policies include at least one of:
 - if the deadline is reached and an alert has not yet been delivered, the alert is delivered at the deadline;
 - if a deadline will pass and there is no purpose in waiting, then the alert is passed immediately.

7. The system of claim 4, the sensors determine a user current cost of interruption or state of busy-ness.
8. The system of claim 4, the sensors determine when a user available to receive information.
9. The system of claim 3, further comprising sensors that determine information relating to the transmission reliability.
10. The system of claim 9, the sensor information is passed to a central notification manager that is deliberating about where to send messages, or an endpoint device computes the transmission reliability from related sensors and passes the transmission reliability to the central notification manager.
11. The system of claim 2, the bounded deferral period is employed to allow a system to take dialog initiative in a conversational application.
12. The system of claim 11, the application at least one of initiates a conversation or continues a conversation that has been interrupted by a user's attention being diverted elsewhere for a task or another conversation.
13. The system of claim 2, further comprising a prioritization system, wherein the bounded deferral period is a function of an inferred urgency or priority of a message.
14. The system of claim 1, further comprising a gaze sensor to determine when a user observes a display.
15. The system of claim 14, further comprising a deferral period until a user looks away from an item of importance absorbing the user's attention.

16. The system of claim 9, the sensors compute a transmission reliability based on at least one of heat, motion, acoustical information, and wireless information.
17. The system of claim 1, further comprising a component that causes bounded deferral and transmission reliability to interact.
18. The system of claim 17, further comprising a component to determine if a transmission reliability has reached a threshold before a deferral tolerance is reached, a user can be notified via a first type of alert while bypassing a second type of alert.
19. The system of claim 2, the bounded deferral period is applied to putting a caller on hold and enabling a break through over a predetermined time horizon.
20. The system of claim 19, the bonded deferral is applied by an endpoint device or by a standard communications system connected to sensors.
21. The system of claim 1, further comprising bounded deferral policies that are coordinated with other parameters.
22. The system of claim 21, the other parameters are related to a user's location and/or context.
23. The system of claim 1, further comprising tasks of predetermined length that are available in contexts where a user is reviewing media.
24. The system of claim 1, further comprising global bounded deferral policies that are viewed as approximation of more detailed decision-theoretic analyses.
25. The system of claim 1, further comprising a component to provide low time criticality messages during a breakthrough period of another message.

26. The system of claim 2, when a bounded deferral policy has been reached, an endpoint device can be instructed to send a message back to a central notification manager or a sender of an alert, informing the central notification manager that the endpoint device is unsuccessful at relaying a message.

27. A system that facilitates conveying notifications, comprising:
a device that is associated with a user, the device gathering data related to at least one of an attentional state of the user and location of the user; and
a notification component that employs at least a portion of the data in connection with providing a notification.

28. The system of claim 27 employing bounded deferral data in connection with providing the notification.

29. The system of claim 28, the bounded deferral data is determined in consideration of a tolerated period that is a function of at least one of a notification sender and a type and/or content of a message delivered.

30. The system of claim 27, the device employs one or more sensors locally to determine a suitable time within an indicated bounded deferral period to alert a user.

31. The system of claim 30, further comprising assigning more urgent messages a shorter bounded deferral period.

32. The system of claim 27, at least one of the device and the notification component process multi-message interactions, such that when a message breaks through to the user, other parties can be allowed to come through to the user.

33. The system of claim 27, at least one of the device and the notification component assigns a value for multiple messages that leads to a shorter bounded deferral period.

34. The system of claim 33, at least one of the device and the notification component determine a sum of the value of independent messages.
35. The system of claim 28, further comprising one or more parameters on the bounded deferral data that is locally computed or determined based on local analysis of identity of a sender or nature of a message content.
36. The system of claim 35, the parameters are received as part of metadata or control data from a central notification manager, the metadata or control data included in a notification schema associated with a message.
37. The system of claim 35, the parameters are a function of a variable set by another user or a function of a priority value set by a notification manager.
38. The system of claim 27, the device is associated with one or more application models.
39. The system of claim 38, the application models include local calendar information to guide a device to hold alerts until after an event.
40. The system of claim 38, the application models include sound receptors that are employed to sense when someone has stopped speaking or sense a background noise.
41. The system of claim 38, the application models includes one or more motion devices to sense at least one of a user's movements, a user's has stopped talking, or when a car has stopped.
42. The system of claim 38, the application models process ringing after a bounded deferral period is reached and then again as backup after quiet or other sensor condition.

43. The system of claim 38, the application models pause until a person is in proximity or has touched a device before delivering a notification.
44. The system of claim 38, the application models automated cause deferral of a phone ring, wherein silence is applied for a predetermined number of rings while waiting for speech to stop.
45. The system of claim 44, the application models employ an agent picking up a phone if a user is sensed to be temporarily busy and asking a caller to hold on, then connecting through when the user has stopped speaking or if a bound has been reached.
46. The system of claim 45, the agent performs phone ringing deferral for selected people or people within specially indicated groups.
47. The system of claim 38, the application models employ at least one of a Global Positioning System (GPS), an 802.11 signal strength sensor, an infrared proximity sensors, and a touch sensor.
48. The system of claim 27, at least one of the device and the notification component determines at least one of attention-sensitive costs of disruption, a value of information, a loss based in decreased fidelity, and a transmission reliability associated with the use of an alerting modality of the device.
49. The system of claim 48, the transmission reliability of the device is represented as a probability p , $p(\text{transrel} \mid \text{context})$, that is the likelihood of getting through on the device given context, the context is a function, $f(\text{context})$ or $f(\text{sensed states})$.
50. The system of claim 27, further comprising a subscription service provided at a notification source that enables users to tag notifications according to a predefined priority.

51. The system of claim 50, the predefined priority is assigned based upon a happening of a condition.
52. The system of claim 50, further comprising a subscription user interface to enable users to configure attributes of a notification.
53. The system of claim 52, the attributes are defined in a notification schema.
54. The system of claim 27, further comprising a prioritization system that automatically assigns priorities to the notification.
55. The system of claim 54, further comprising a max deferral setting that is associated with a notification priority to enable at least one of a delivery of the notification at a time-out of the max deferral, and deferral of the notification to a likely available free state.
56. A computer readable medium having computer readable instructions stored thereon for implementing at least one of the device and the notification component of claim 1.
57. A system that facilitates communications, comprising:
 - means for sensing a state of a user; and
 - means for employing the sensed state in connection with conveying a notification to the user.
58. A method that facilitates conveying notifications, comprising:
 - using at least one device to determine and/or infer information regarding an attentional state and/or location of a user; and
 - employing the information in connection with decision-making regarding conveying a notification to the user.

59. The method of claim 58, further comprising employing a decision model in connection with the decision-making, the decision model includes processing of at least one of a value of actions and a cost of actions to determine an expected utility regarding conveying the notification to the user.

60. The method of claim 59, the value of actions and cost of actions are determined in part from a consideration of the user's attentional focus and workload.

61. The method of claim 60, the user's attentional focus and workload is determined in part by a consideration of at least one of perceptual sensors, device interactions, a calendar, a day, and a time.

62. The method of claim 58, the attentional state and/or location of the user is determined from a temporal decision model.